



جامعة صنعاء
كلية الطب والعلوم الصحية
دفعه بصمة طبيب 31
طب بشري

Lecture No. 18

ophthalmology

ERROR OF REFRACTION

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Group F

اللجنة العلمية لدفعه بصمة طبيب 31

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The eye is considered as a receptor for the formation of images that why an ophthalmologist should make sure that the images reaches the retina clearly .The interpretation of the image is done by the brain .

To make sure that image is clear the ophthalmologist should treat any disease that affect the eye such as cataract , inflammations avoid the occurrence of adhesions ,optic atrophy etc

For the focusing system to be clear there should be a transparent media represented by clear cornea ,lens and vitreous then the picture should be focused on the macula in the presence of a good functioning optic nerve .the neuro_vascular balance should also be considered.

What qualifies the eye to be a optical system?

- . the retina is sensitive to specific wave length 440-760 nm visible wave length

- .refractive property

The infinity produces parallel rays in the relaxation of the accommodation the rays will fall on the fovea as a small inverted picture

So the curvature of the cornea with the curvature of the lens forms the refractive system with the presence of a proper axial length 22-24 will focus the image on the fovea this is the normal refraction of the eye emmetropia

If the axial length got longer or the refractive system is strong the image will be formed in front of the retina

Accommodation :

The 3rd nerve is responsible for this property mediated by the parasympathetic supply

Increasing convexity of the anterior capsule of the lens

Rays coming from 6 meters or more are considered as parallel rays so if the rays come from a distance closer than this the accommodation starts to function .

Miosis

Convergence

Asthenopia: eye strain which occurs when there is ignorance of wearing the glasses

Manifested by headache tearing lid margin redness.....etc.

Refraction is the change of the direction of light that results from the change of its speed when passing through different mediums

The refraction power of air is 1

The refraction index of aqueous is 1.3

Polymethylmethacrylate has a high refractive index that's why it can be used to be planted in place of the lens

Reflection is the bouncing back of light

Small eye gives myopia and large eye gives hypermetropia this is the effect that happens to the axial length

If the effect occurs on the refraction index will be presented as keratoconus(myopia)

Cornea plane (hypermetropia) or lenticular(myopia)

In hyperglycemia the permeability of the lens increases and the glucose enters the lens and affects its curvature (myopia)

Early cataract this will cause more bending of the light causing more myopia

When the person sees an object that is so far a relapse for the accommodation occurs

Vice versa when seeing a near object

It's said that civilization encourages myopic shift and this is not found in the people in the rural areas because in rural areas people don't use accommodation that much .

The aim of correction

D : diopter is the unit of lens power and is defined as the power of the lens to bring parallel rays falling on the focus at a distance of one meter

The rule is $D = 1/f$

If the far point (f) is +0.5m behind the fovea (hypermetropia)

$$D = 1 / +0.5M$$

$$D = +2.00$$

Astigmatism: it's a curvature anomaly such that the parallel incident rays don't focus on a point but are rather drawn in a line

Since we use our eyes mostly in the vertical direction the vertical curvature is more than the horizontal e.g. in blinking

With the rule astigmatism is when the meridian with greater refractive power is in the vertical direction btw 70-110 degree

Against the rule is when the meridian with the greatest r.p. is in the horizontal direction btw 160-20

When the transition btw the vertical and the horizontal is 90 degree this is called regular astigmatism

If they are not particular it's called irregular astigmatism in keratoconus cataract or lenticulus

Irregular astigmatism is treated by keratoplasty, rigid contact lens

Myopia

Doesn't use accommodation they suffer from divergent squint

Latent squint (exophoria) which can turn to asthenopia

Axial myopia also called pathological degenerative progressive and malignant

Here the retina might be degenerated from the periphery and this leads to choroiditis

L.d. degeneration occurs in 70 percent is a hole that happens in the vitreous so more fluids enter from this hole causing spontaneous retinal detachment

Hypermetropia :

Optic disc is small and red and can be confused by papilledema in many cases its called pseudopapillitis when seen with the ophthalmoscope

in myopia the optic disc is wide.

Complications : isotropia in children and are suspected to close angle glaucoma

Iridectomy is used as a prophylactic when the child gets older and the lens gets bigger by age while the eye is already small so the angle might be closed at any time.

Astigmatism:

With the rule when vertical is higher

Against the rule is when the horizontal is higher in old age

If one of the meridians is normal and focuses on the fovea but the meridian that is perpendicular to it is myopic this is called simple myopic astigmatism

In compound astigmatism both of the meridians are myopic or hypermetropic

In mixed one is myo but the other is hypermetropic

In spherical glasses the error is corrected in 360 degree = corrected in all directions

In regular astigmatism the aim of the treatment is to change the points from a line on a line to focus at a point and to do that we use a cylindrical lens this lens will only correct rays

coming perpendicular to it (90 degree)-unlike the spherical (360 degree)- by doing this the perpendicular error will be corrected and the other will be ignored so the two will be united to change the refracted error from forming a line to form a single point which can be then corrected by a spherical lens

To know if the glasses is cylindric a straight line is drawn and the lens is moved in circular direction if the the is bent this is a cylindrical lent if not its spherical

Clinical picture if the number is small asthnpia occurs if the defect is high a blurring of vision will only occurs cuz the accumidation wont be affected and no asthenopia is going ti occur

If the astigma is myopic the same complicaons of axial myopia happens

ICL: is an inject able lens with its axis is done with topical Anastasia but can cause cataract as a side effect or glaucoma

Anisometropia

Brain can fuse the pictures from both eyes if the difference between them is less than 4.D

In children a squint may rise as a complication but in adults diplopia may occurs

Aphakia it's a variation from a high hypermetropia

Some surgeons might treat myopia by removing the lens

One of the solutions to aphakia is to remove the lens of the other eye

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نتمنى من الله التوفيق لنا جميعا والمعذرة إذا في أي تقصير أو خطأ.....

المندوبه
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